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ABSTRACT

Reduced training costs, worldwide accessibility, and improved technological capabilities have made Web-based training (WBT) a viable alternative to classroom instruction. WBT enables businesses to cut their training costs. Efficiency of operation is another major advantage of WBT. The flexibility of time, place, and programs offered via WBT appeals to learners who must balance school with work and home responsibilities. Task- and detail-oriented people who are focused in their study habits and engaged in learning tasks requiring creative thinking and analysis are most successful in using computer-based, online programs. Virtual classrooms can be asynchronous and synchronous. Asynchronous classrooms allow students and instructors to engage in collaborative learning activities without being online at the same time. Synchronous classrooms are more reflective of traditional classrooms because they allow instructors and students to be online simultaneously. WBT programs must be designed to accommodate learners' needs, allow learners the freedom to follow unique paths to learning in their own cognitive styles, and require students to construct meaning. Studies of the advantages and disadvantages of WBT training have identified tips to help instructors use the Web's technological capabilities to advance their teaching and learning goals with the same quality achievable through the best classroom instruction. (Contains 14 references.) (MN)

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Web-Based Training

Education and training via the World Wide Web are growing rapidly. Reduced training costs, world-wide accessibility, and improved technological capabilities have made electronic instructional delivery to adult learners a viable alternative to classroom instruction. This Digest examines the efficacy of Web-based (WBT) training, including issues of market demand, learner participation, training options, and program design. It also discusses learning outcomes and gives suggestions for how these outcomes can be improved through implementation of appropriate instructional design principles.

Market Demand

It is estimated that technology-assisted training will represent half of all training methods by the year 2002 (McGee 1999). Particularly appealing to industry are the cost savings such training affords. PNC Bank Corp in Pittsburgh, for example, recently installed a system for self-paced online training through which it expects to save as much as 40 percent per user in training expenses (ibid.). MCI WorldCom slashed approximately $3 million in travel, facility, and labor costs over a year by offering 20 percent of its classes over the Web. The company expected to increase this to 50 percent in 1999 (Greengard 1999). By switching from classroom to Web-based training, some companies have realized up to 75 percent savings in their training budgets, making this mode of training especially appealing to companies that have large numbers of employees to train (Cole-Gomolski 1999). Travel expenses, instructor fees, facility costs, materials, and office equipment costs, in addition to the cost of lost time on the job when employees are in training represents some of the savings that are realized through Web-based training.

Efficiency of operation is another advantage Web-based training offers to companies that must now compete in a global marketplace. Intranets help to eliminate delays in introducing new products by offering companies the capability of training their entire sales staff simultaneously, even when they are located at different sites across the globe. Additionally, as organizations become increasing flat through restructuring, Web-based training delivery is a welcome alternative to managers who have little time to devote to the training of new employees and to administrators who no longer need to find, schedule, and staff classes that will meet the varied training and educational needs of diversely skilled employees (Driscoll 1999).

Learner Participation

The flexibility of time, place, and programs offered via Web training is appealing to learners who are trying to balance school with work and home responsibilities. They can mix modes of instruction, even accumulating college credits and meeting residency requirements for degrees. Employees who seek flexible work hours and telecommuting work arrangements are being drawn to companies that offer similar opportunities for them to upgrade their skills. Given the choice, increasing numbers of learners are taking distance education courses, often congruently with their on-campus coursework. Community residents who wish to engage in lifelong learning are finding many options available to them via the Internet. Online learning communities such as Senior Net make it possible for learners of any age to connect with people in a variety of geographic locations who have the same interests and needs, thus eliminating many of the barriers imposed by physical limitations and age (Russell 1999).

Most successful in using computer-based, online programs are people who are focused in their study habits, engaged in learning tasks that require creative thinking and analysis, and task and detail oriented (Wonacott 2000). Grill (1999) describes the typical American distance learner as one who is 25-50 years of age, taking courses to learn new subjects and skills or to update old ones, and experienced in participating in education.

Training Options

Virtual classrooms are of two types–asynchronous and synchronous. "Asynchronous classrooms allow students and instructors to engage in collaborative learning activities without being online at the same time. They are well suited to develop skills that require analysis, synthesis, and evaluation" (Driscoll 1999, p. 23). Synchronous classrooms are more reflective of the traditional classroom as they allow the instructor and student to be online at the same time—brainstorming, questioning, discussing, and debating (ibid.). E-mail, online forums, bulletin boards, chat rooms, and listservs (discussion groups) are a few of the tools available to students in these classrooms (Wonacott 2000).

In spite of its utility for a variety of purposes, the Internet is not always the best training option. Tasks that require use of interpersonal skills are better facilitated through classroom role playing and one-on-one interactions. Heckler (1999) contends that "WBT courses tend not to be as interactive as instructor-led ones, and the absence of an instructor means that most students will not push themselves as hard" (p. 4). However, Clark and Lyons (1999) note that the type of training offered on the Web is the determining factor in whether or not learning occurs. For example, when multimedia instruction that includes sound, animation, and/or video is used, the learner can become actively involved in learning processes through online animation. When interactivity is added to the mix, the program's capabilities are similar to those of CD-ROM programs and "can be used to construct 'guided discovery' environments, e.g., courses that teach physicians to diagnose patients by taking a medical history, conducting an examination, and running lab tests" (ibid., p. 54).

Program Design

Because "most WBT programs are little more than self-paced learning, success in these programs hinges on the learner's ability to engage in self-directed learning and to develop metacognitive skills for the Web" (Driscoll 1999, p. 24). However, a focus on the development of problem-solving and critical-thinking skills requires that Web-based training programs be designed to accommodate the needs of the learner, giving him/her the freedom to follow a unique path to learning in his/her own cognitive style. For example, to learn about ways to relieve the symptoms of arthritis, one learner may search the ABI Inform database to find information on a drug to relieve arthritis pain by using the drug's name, e.g., Celebrex; another learner may search the Medline database to find information about the disease by using the name of the disease itself, e.g., arthritis; yet another learner may use a search engine to find information about companies that manufacture arthritis drugs, e.g., Pfizer. In each of these searches, the learner accesses information in sequences that are appropriate to his/her unique style of learning.

Web-based learning tasks should require students to construct meaning rather than repeat information they have read or heard. The

instructor must assume the role of facilitator or coach and develop activities with advanced organizers, hyperlinks, and appropriate scaffolding to help students in their knowledge construction. This constructivist approach to teaching and learning, when applied in Web-based learning environments connects "content (knowledge), form (documents and activities), and thought processes (cognitive progressions and assistance)" (Giroux, Hotte, and Dao 1997, p. 3).

With more advanced program designs, the networking power of the Web must be well integrated with the design elements. "Designers make use of learning communities, foster communication between teacher and student, and use the computational power of the Web to provide rich media that enhance the learning process" (Driscoll 1999, p. 25). Recommendations for designers of Web-based instruction that are consistent with current research in Web design include the following (Mory, Gambill, and Browning 1998, p. 106):

- Give a detailed timeline, but provide external cues and imposed deadlines to help students stay on track.
- Obtain data and evaluate student reactions to the course throughout the semester to gain insight into the workload a student must handle at any given time.
- Provide adequate technical support.
- Offer a variety of presentation forms to gain and maintain student attention and continuing motivation.

Learning Outcomes

Ball State University conducted a study to compare students' impressions of classroom training and Web-based training when the same instructional method was used in each program. One group of students engaged in learning in the traditional classroom, and another group used Web-based electronic modules developed by nursing faculty. Comparison of the traditional classroom methods (seminars) and electronic modules revealed the following (Ryan, Carlton, and Ali 1999, p. 275):

In the classroom setting, students perceived that the content was covered more adequately, there was more interaction and participation, and faculty preparation and expertise were more important to learning. Students expressed the need for better communication skills, self-discipline, and knowledge of computer technology. In general, however, the WBT students felt that electronic instruction facilitated greater depth of learning and afforded greater ability for them to participate in discussions as no one student was able to monopolize the conversation. In discussing the difficulties with electronic instruction, students mentioned that they felt disconnected from their class members, frustrated by a poor flow of communication and technical problems, and confused by feedback that was not always clear. They missed having face-to-face contact with their instructor where they could experience verbal as well as nonverbal communication. A significant outcome of the study was that teachers came to recognize their need for better preparation, time, and effort in delivering electronic instruction.

Implementation Tips

Clark and Lyons (1999) emphasize the importance of good instructional methods that are based on the needs of the learner and on the job they are being trained to perform. The effects of learning cannot be determined until the principles of learning and instruction that have been successfully used in the classroom can be replicated in another form for computer-based instruction. Some tips for doing this include the following (Black 1998):

- Offer short classes.
- Make graphics simple and easy to read.
- Foster collegiality by asking students to contribute information about themselves and their interests.
- Vary the way you interact with learners.
- Avoid superfluous media; e.g., it might be important for a nurse to hear the sound of a pulse beating, but unnecessary to hear the package ripping when extracting a disposable needle.
- Use a combination of synchronous and asynchronous instruction to reinforce new material, make assignments, and improve learner retention.

Web-based education and training are here to stay. Companies can train thousands of employees in interactive sessions that allow for consistency of messages and facilitate the exchange of different insights and perspectives as well as sharing knowledge and asking questions. Teachers can use technological capabilities built into the Web to advance their teaching and learning goals and foster construction of meaning. All learners—business, college, and community—can engage in collaboration with many people or groups as a means of enhancing their learning. These advantages, however, can be realized only when Web-based training is of the same quality as the best classroom instruction.

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